Are pain provocation tests useful in diagnosing SI joint pain in middle aged males?

The sacroiliac (SI) joint can be a source of low back pain with or without referred pain into the lower limb. Pain provocation tests can be used to improve the ability to rule in or rule out the SI joint as the source of chronic LBP in patients with pain below L5, pain over the posterior aspect of one SI joint (with or without leg pain), and pain at least 45 mm on the visual analog scale (VAS). When 3 or more pain provocation tests are positive, the positive likelihood ratio is 4.02 (CI 95%, 2.04-7.90) which indicates an intermediate probability that the SI joint is the source of pain. When fewer than 3 tests are positive, the negative likelihood ratio is 0.19 (CI 95%, 0.07-0.47) which indicates a moderate probability that the SI joint is not the source of pain. Due to the stronger negative likelihood ratio value of 0.19 (CI 95%, 0.07-0.47), the pain provocation tests for the SI joint may be more useful in determining when the SI joint is less likely to be the source of chronic LBP. Level of evidence: 1b.

Citation/s:

- 1. van der Wurff P, Buijs EJ, Groen GJ. A multi-test regimen of pain provocation tests as an aid to reduce unnecessary minimally invasive sacroiliac joint procedures. Arch Phys Med Rehabil 2006;87:10-14.
- 2. Laslett M. Evidence-Based Diagnosis and Treatment of the Painful Sacroiliac Joint. J Manipulative Physiol Ther 2008;16:142-152.
- 3. Laslett M, Aprill CN, McDonald B, Young SB. Diagnosis of sacroiliac joint pain: Validity of individual provocation tests and composites of tests. Man Ther 2005;10:207-218.
- 4. Kokmeyer DJ, van der Wurff P, Aufdemkampe G, Ficenscher TC. The reliability of multitest regimens with sacroiliac pain provocation tests. J Manipulative Physiol Ther 2002;25:42-48.

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Three-part Clinical Question: In a 45 yo male with R LB/buttock pain, are SI pain provocation tests valid tests to use to diagnose SI joint pain?

Search Terms: sacroiliac joint AND pain provocation tests (Pubmed Database - Clinical Queries with Broad Scope, 4th out of 15 articles)

The Study: Prospective, observational study

The Study Patients: Between January 2001 and April 2002, 140 patients with chronic LBP were referred to the pain clinic at Gelre Hospital Apeldoorn in The Netherlands. Sixty of these 140 patients entered the study. Inclusion criteria: pain below L5, pain over the posterior aspect of one SI joint with or without leg pain, pain at least 45 mm on VAS, and pain lasting longer than 50 days. Exclusion criteria: < 18 or > 80 years old, diagnosis of ankylosing spondylitis, leg length discrepancies of more than 2 cm, Waddell score more than 2, osteoporosis, tumors,

infection or recent fracture in the spine region, OA of the hip, radicular pain with neurologic signs, pregnancy, anticoagulants, and the presence of liver and/or kidney failures. The mean age of the patients was 51 years old \pm 13 years. Thirteen patients were men and 47 were women. The average duration of complaints was 98 months \pm 91 months, and the average score on the VAS was 59 ± 20 .

Independent, blind comparison with a reference (gold) standard. There was not an appropriate spectrum of patients. The gold standard was applied regardless of the test result.

Target disorder and Gold Standard: sacroiliac joint pain, SI joint double block injections Diagnostic test: Five SI joint pain provocation tests (distraction test, compression test, thigh thrust test, Patrick sign, and Gaenslen test) were used in this study. 1. The distraction test is performed by applying cross-armed pressure to the anterior superior iliac spines (ASIS) with the patient in supine. The examiner exerts pressure in a dorsal and lateral direction with the arms. 2. The <u>compression test</u> is performed by applying downward pressure over the anterior edge of the iliac crest with the patient in sidelying. 3. The thigh thrust test is performed by flexing the hip to ~90°, slightly adducting the femur, and then applying a graded force through the long axis of the femur to cause an anterior to posterior shear force to the SI joint. 4. The Gaenslen test is performed by having the subject lie supine close to the edge of the treatment table with one leg hanging over the edge of the table. The examiner guides the knees to the chest until the subject's lower back assumes a physiologic lordosis. The examiner then fixates the contralateral leg in maximal hip flexion with slight hip adduction and slowly lowers the ipsilateral leg into hip extension applying a light downward pressure to the ipsilateral leg. 5. The Patrick sign is performed by having the subject lie supine and then flexing the knee and placing the medial side of the heel against the knee of the other leg. The examiner then slowly lowers the test leg toward the examination table while applying pressure to the contralateral ASIS. The examiner applies a light overpressure to the subject's knee.

The scoring for all pain provocation tests was dichotomous: positive or negative. The tests were considered positive if the patient experienced their familiar pain. The tests were considered negative if the patient experienced pain before full range was obtained, if the evoked pain was not characteristic of their pain, or if no pain was evoked.

The Evidence:

	Target Disorder: SI joint pain				-
Test: Pain Provocation Tests	Present		Absent		_
Test Result	Num	Prop	Num	Prop	Likelihood Ratios
Positive	23	a	7	b	4.02 2.04 to 7.90
Negative	4	c	26	d	0.19 0.07 to 0.47

Sensitivity: 85%; CI: 72 to 99

Specificity: 79%; CI: 65 to 93

Prevalence: 45%; CI: 32 to 58

Positive Predictive Value: 77%; CI: 62 to 92

Negative Predictive Value: 87%; CI: 75 to 99

Comments:

Are the results valid?

- 1. A wide representative spectrum of patients was not used for this study. The spectrum of patients included only patients with chronic complaints of low back pain (avg. duration of symptoms = 98 months). Therefore, patients with acute episodes of low back pain were not included. Also, the authors did not state clearly whether the 60 out of 140 patients who visited the pain clinic between January 2001 and April 2002 were the only ones to meet the inclusion criteria or if they were the only ones who agreed to participate in the study. Therefore, it is difficult to determine if the patients who participated in the study were consecutive patients or randomly selected. If this fact was known, then the internal validity of the study would be stronger as selection bias would be reduced.
- 2. There is no true gold standard for diagnosing sacroiliac joint pain. Recent literature states that diagnostic SI injections are the best available reference standard for identifying intra-articular SI pain.² In this study, each patient underwent 2 diagnostic SI injections on separate occasions. The reference standard was applied to all patients equally in the study which helps to improve the validity of this study. A similar study done by Laslett et al³ found very comparable results as this study, but the validity of that study was compromised due to the reference standard not being applied equally to all subjects.
- 3. There was an independent and blind comparison between the provocation tests and the reference standard of diagnosis (i.e. diagnostic injections). The investigator who performed the provocation tests before the first injection was unaware of the patient's medical history, and the anesthesiologist who performed the injections was unaware of the results of the provocation tests. Furthermore, the sequence of the injections was at random and known by the anesthesiologist only. These aspects of the methods helped to reduce bias by the investigators.

What are the results?

- 1. A correlation was found between the outcome of 3 or more positive SIJ pain provocation tests and the outcome of the diagnostic SI injections. For 3 or more positive tests the sensitivity was 85% (CI 95%, 72-99%) and the specificity was 79% (CI 95%, 65-93%). The negative predictive value was 87%, and the positive predictive value was 77%. The point estimates for sensitivity and specificity are both moderately high, and the high ends of the confidence intervals are high (99% and 93% respectively).
- 2. The positive likelihood ratio for the threshold of 3 positive pain provocation tests was 4.02, and the negative likelihood ratio was 0.19. A positive likelihood ratio of 4.02 is small and would generate a small (but sometimes important) shift in pre- to post-test probability. The high end of the 95% confidence interval for the positive likelihood ratio (2.04-7.90) might generate a moderate shift in probability. A negative likelihood ratio of

0.19 is moderate and would have a moderate effect on the pre- to post-test probability. The stronger value of the negative likelihood ratio compared to the positive likelihood ratio signifies that fewer than 3 positive tests corresponds to a moderately high probability that the patient's pain is not related to the SI joint. However, one must keep in mind that the high end of the 95% confidence interval (0.07-0.47) indicates that the negative likelihood ratio may indicate only a small (but sometimes important) shift in probability.

How can I apply the results to patient care?

- 1. Van der Wurff et al. did not describe the pain provocation tests in detail in this study, but the authors stated that the details of the execution of these tests could be found in a previous study by Kokmeyer et al⁴. Review of this study provided a very detailed description of how to perform each test. The pain provocation tests for the SI joint are easy to reproduce and can be easily replicated in any treatment setting. The only needed equipment to perform these tests is a treatment table.
- 2. The results of this study are applicable to the patient population at FCC Butner as the majority of patients with low back pain evaluated at FCC Butner have chronic symptoms. The average age of the patients (51 years ± 13) in this study is also very comparable to the population at FCC Butner. The primary difference is that 78% of the subjects in this study were women, and FCC Butner has an all-male inmate population. This difference should be considered when applying results to the inmate population at FCC Butner.
- 3. The results of this study will impact my management strategy when evaluating and treating patients with chronic LBP who meet the same criteria as the inclusion criteria for the subjects in this study. The SI joint pain provocation tests can be incorporated into the early clinical decision making process to determine if the SI joint is a likely source of the patient's pain. Having fewer than three positive pain provocation tests is more helpful in ruling out SI joint pathology during the clinical decision making process. However, as a therapist I must always remember to consider how a patient responds to treatment and use this information to confirm or refute the diagnosis that was established during the initial evaluation. The use of the pain provocation tests for the SI joint can help to improve the probability of determining a clinical diagnosis, but they cannot be relied on exclusively to make the diagnosis.

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Kill or update by: 17 February 2011.

Particular to my patient:
Pre-test probability:

13% ²

Test Result Post-test probability

Positive 38% Negative 3%